

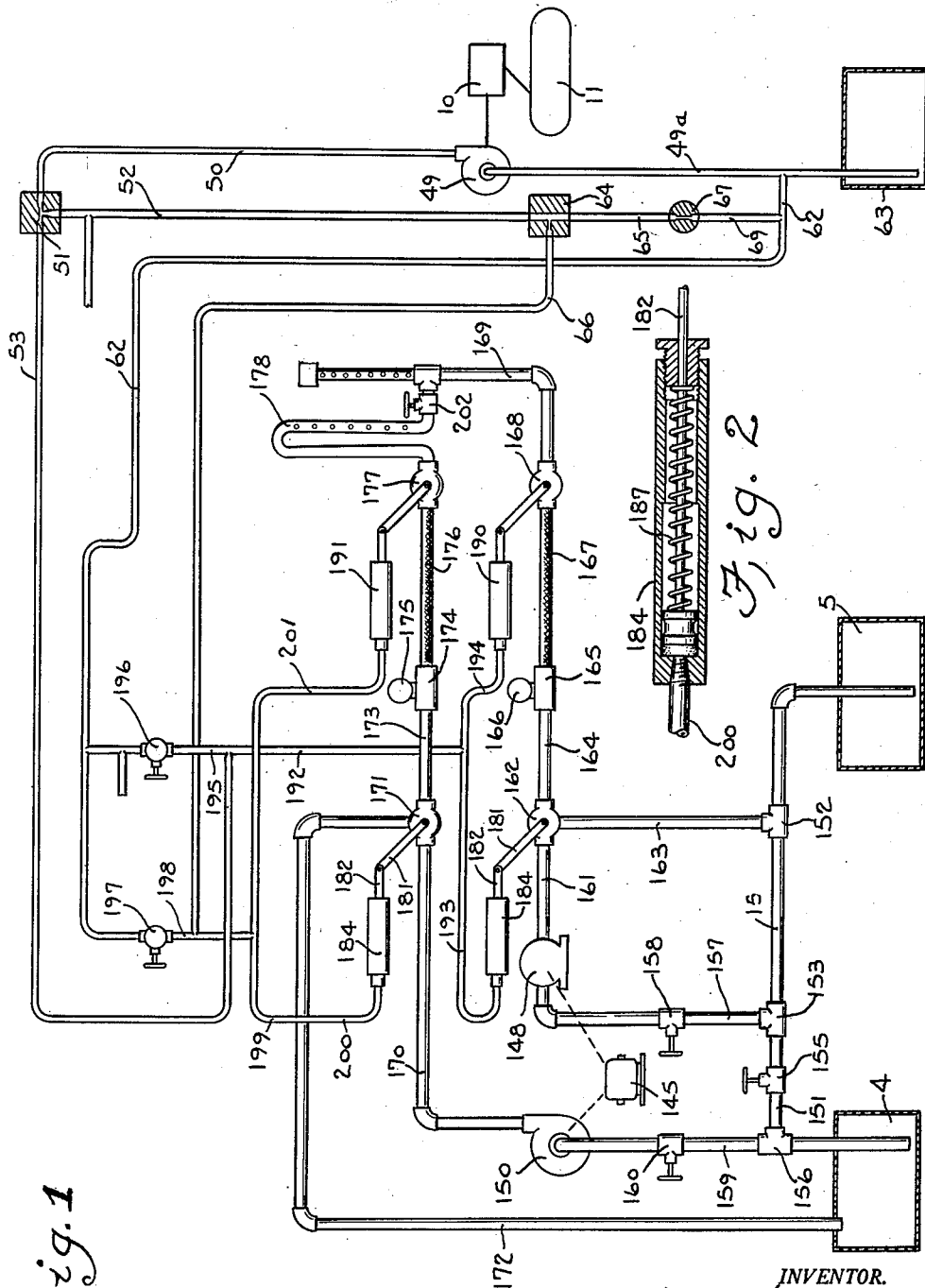
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BINDER SUPPLY SYSTEM

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BINDER SUPPLY SYSTEM

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4 Claims. (Cl. 299—46)

1

The invention relates to a traveling material treating apparatus for conditioning the material used for making roads or other pavements at the place of use.

This application is a division of my copending application Serial No. 514,177, filed December 13, 1943, now U. S. Patent No. 2,424,459, dated July 22, 1947, and relates more particularly to the means for supplying the binder ingredient to the road materials during the mixing operation.

According to the aforesaid application, in the making of road or other pavements, the material operated upon by the soil treating unit is subjected to the action of a rotary cutter and a target rotor to thoroughly mix and blend the material which is then transferred to a blading mill where it is further mixed and then deposited upon the road bed. During the transfer of the blended road materials they are sprayed with a suitable binder ingredient with which they are thoroughly mixed while in the blading mill. The binder ingredient is carried or temporarily stored in the transporting unit, and according to the present invention, means are provided on said unit for putting binder ingredient under pressure and delivering it under the control of the operator to the spraying device on the treating apparatus. As the binder ingredients may be of different kinds, such as water in the case of a cement binder and petroleum in case of an asphaltic pavement, provision is made for handling both types of binder ingredient through the same spraying apparatus as herein-after explained.

The invention further consists in the several features hereinafter described and more particularly defined by claims at the conclusion hereof.

In the drawings:

Fig. 1 is a diagrammatic showing of the binder supply system and its controls;

Fig. 2 is a detailed vertical sectional view taken through one of the spring loaded hydraulic actuators.

Referring to Fig. 1 of the drawing, the numeral 10 designates the engine of the propelling unit 11 which it drives. Engine 10 also drives a pump 49 which supplies hydraulic operating fluid to a pipe 50 which joins with a volume limiting T-coupling 51 through which the fluid has free passage into pipe 52. T-coupling 51 is so arranged that a branching stream of fluid of limited volume may escape therefrom into pipe 53 which as hereinafter described connects with a pipe 195.

2

The pipe 52 connects with a second volume limiting T-coupling 64 similar in all respects to the T-coupling 51 through which fluid may freely pass to pipe 65 while a limited stream may escape into pipe 66. Pipe 65 in turn joins with a fixed aperture back pressure orifice 67 so constructed as to permit fluid to pass therethrough but to maintain ahead of it a pressure equal to the intended operating pressure of the system. Pressure fluid returns to the supply tank 63 through pipes 69 and 62 and is carried to the pump 49 through pipe 49a.

Tanks 4 and 5 for binder ingredient are suitably mounted on the transporting unit 11.

Because of the variation in viscosity between water and the bituminous binder compositions to be handled, two pumps, one a centrifugal pump 150, and the other of the positive displacement type pump, 148, are provided. These pumps through suitable clutch mechanism shown in full in the application heretofore referred to are adapted to be selectively or conjointly connected to an engine or prime mover 145.

A cross connecting pipe 151 provided with T's 152, 153, 156 connects at its ends with tanks 4 and 5 and has a valve 155 mounted therebetween the T's 156 and 153.

Pump 148 is connected on its suction side with the pipe 151 at the T 153 by a pipe 157 which rises and passes through the valve 153 and then to the pump. Pump 150 is connected on its suction side with the pipe 151 at the T 156 by a pipe 159 which has a valve 160 mounted therein. In this way the pumps 148 and 150 being connected to the cross pipe 151 on opposite sides of the valve 155 and each being provided with a valve controlling their inlets may be employed simultaneously or separately either to draw fluid simultaneously from both of the tanks 4 and 5 with valve 155 open or by closing this valve to draw from single tanks separately.

The discharge from pump 148 is carried by pipe 161 to a proportioning by-pass valve 162, the side diversion outlet of which is joined by a pipe 163 with the cross connecting pipe 151 at the T 152. The principal stream outlet of valve 162 passes through pipe 164 to a volume meter 165 and pressure gauge 166 and thence through the hose 167 to a hydraulically operated shut off valve 168. The flow from valve 168 is finally carried by joining connections into a distributing spray pipe 169.

In similar manner discharge from pump 150 is carried by pipe 170 to a proportioning by-pass valve 171, the side diversion outlet of which is

carried into tank 4 by return pipe 172. The main stream outlet of valve 171 is joined by a pipe 173 which passes to a volume meter 174 and pressure gauge 175 from which hose 176 leads to a hydraulically controlled shut off valve 177. Flow from valve 177 is finally carried by connections to a distributing spray pipe 178. Spray pipes 169 and 178 are interconnected by cross piping including a valve 202, so that the capacity of both may be availed of to handle fluid delivered by either pump, if desired.

The proportioning by-pass valves 162 and 171 are similar in construction and are arranged to be hydraulically operated as shown more in detail in the aforesaid parent application, each valve being operated by a piston working in a hydraulic cylinder 184 whose piston 182 is connected with the valve by an operating lever 181. Each piston is initially loaded by a spring 187 interposed between the piston and the end plug 183. These valves are preferably piston type valves.

Similar hydraulic actuators 190 and 191 are provided, respectively, for valves 168 and 177 with the exception that the returning springs thereof which are shown in detail in the aforesaid application are weaker to such an extent that a pressure sufficient to overcome the initial compression of the springs associated with either of the valves 162 or 171 will be sufficient to cause valves 168 and 177 to be fully opened.

To supply and regulate the fluid under pressure for actuation of valves 162 and 168, fluid available in branch conduit 53 is connected by conduits 192 and 194 with the cylinder 184 of the valve 162 and by conduits 192 and 193 with the actuator 190. A by-pass connection 195 controlled by a hand operated needle valve 196 joins with the return conduit 62. With valve 196 closed, the full discharge pressure of pump 49 is applied to the conduit 192 and with the valve 196 in intermediate stages of adjustment, various regulated pressures are applied to the conduit 192. With the valve 196 open, insufficient pressure is applied to conduit 192 to overcome the return springs in the actuators of either of the valves 162 or 168 and both of said valves remain closed. In this way the operator by closing down on valve 196 first brings about the opening of valve 168 and then by further closing down of valve 196 causes the desired proportion of the delivery of pump 49 to be supplied to the spray pipe 169. By inspection of the meter 165 or gauge 166 or both the operator is thus able to establish any prescribed rate of delivery of fluid desired. Furthermore, in stopping delivery of fluid, complete opening of the valve 196 causes closure of valve 168, thus avoiding prolonged after-drainage of fluid held in the long connections between valve 162 and the spray pipe 169.

In an entirely analogous manner and with analogous results control fluid regulated by the valve 197, interposed in by-pass connection 198 is supplied through conduit 66, connecting conduit 199 and connecting conduits 201 and 200 to actuator 191 and the actuating cylinder 184 for the valve 171, respectively.

Valves 196 and 197 are located on the transporting unit within convenient reach of the operator. A very desirable automatic regulation is also provided by this arrangement due to the action of the fixed aperture back pressure orifice 67, acting in conjunction with the engine driven pump 49. If the engine speed (meaning engine 10) is slowed for any reason, the pressure in the

actuators of valves 162 and 171 will drop, and these valves will be closed a corresponding amount, thus proportioning the rate of application of fluid to the forward speed of the apparatus. In case the engine 10 stalls the valves all close, thus shutting off the flow of liquid.

I desire it to be understood that this invention is not to be limited to any particular form or arrangement of parts except in so far as such limitations are included in the claims.

What I claim as my invention is:

1. In a binder fluid supply system for a material treating apparatus of the class described, the combination comprising a binder fluid reserve tank, a binder fluid pump, a spray pipe, a supply conduit connecting the discharge of said pump with said spray pipe, a proportioning by-pass valve in said supply conduit, having a side branch rejection port, a conduit for disposing of rejected fluid from said side branch port, means connecting the inlet of said pump with said reserve tank, a cut off valve in said supply conduit adjacent to said spray pipe, a spring loaded hydraulic actuator for said by-pass valve, a second spring loaded hydraulic actuator for said cut off valve adapted to respond to a lower actuating pressure than said first mentioned hydraulic actuator, and means for supplying hydraulic actuating fluid to said actuators under controlled adjustable pressure.

2. In a binder fluid supply system for a material treating apparatus of the class described, the combination with a conduit containing a binder fluid under pressure, a spray pipe supplied by said conduit, a cut off valve and a proportioning valve in said conduit, an hydraulic actuator for each of said valves, a source of hydraulic pressure fluid for both of said actuators, and a manually controlled by-pass valve in said source to vary the operation of the actuator for said proportioning valve and to control the operation of the actuator for said cut off valve.

3. An apparatus in accordance with claim 1 wherein the means for supplying actuating fluid comprises a pump connected in driven relationship to a prime mover which in turn is connected in propelling relationship to the material treating apparatus.

4. An apparatus in accordance with claim 2 wherein the source of hydraulic pressure fluid for the actuators comprises a pump connected to a prime mover to be driven thereby at speeds proportional to the speed thereof which prime mover is mounted on said material treating apparatus in propelling relationship thereto.

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